Scientific Papers

Natural History Museum
The University of Kansas

10 April 2002 Number 25:1–8

Two New Subgenera of Bees in the Genus *Centris* (Hymenoptera: Apidae)

By

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CONTENTS

ABSTRACT Two new subgenera, *Aphemisia* and *Schisthemisia*, of *Centris* (Apinae: Centridini) are described and figured. The species of these two new subgenera occur only in South America and were previously included in the subgenus *Melacentris*.

Key Words: Bees; Apidae; Centridini; *Centris*; *Aphemisia*; *Schisthemisia*; *Melacentris*; neotropics.

RESUMEN Dos nuevos subgéneros *Aphemisia* y *Schisthemisia* de *Centris* (Apinae: Centridini) son descritas e ilustradas en este trabajo. Las especies de estos dos nuevos subgéneros son sudamericanas y fueron anteriormente incluias en el subgénero *Melacentris*.

Palabras Claves: Abejas; Apidae; Centridini; *Centris*; *Aphemisia*; *Schisthemisia*; *Melacentris*; neotrópico.

ISSN No. 1094-0782

INTRODUCTION

The tribe Centridini contains numerous large and robust to moderate-sized mainly neotropical species that collect oil from flowers, principally Malpighiaceae and Krameriaceae. The oil is used to provision cells and sometimes in the construction of the cells in the nest (Neff and Simpson, 1981). The members of this tribe can be separated from the remainder of the Apinae by the presence of a jugal lobe as large as one-third of the vannal lobe and the absence of an arolium (Michener, 1944; Stephen *et al.*, 1969).

The subgeneric classification of the Centridini was proposed by Michener (1951, 1954) and Moure (1945), and was later modified by Snelling (1966, 1974, 1984), who recognized 12 subgenera in the genus *Centris*, nine in the genus *Epicharis*, in addition to the genus *Ptilotopus*. A cladistic study by Ayala (1998) indicated that *Centris* is divisible into three groups, with 12 subgenera. Two of these subgenera are described as new below. These new subgenera are included in the group with *Melacentris*, *Ptilocentris*, *Ptilotopus* (no longer considered generically distinct), and *Wagenknechtia*.

A classification of all the genera and subgenera of Centridini is provided by Ayala (1998); papers reviewing the subgenera of *Centris* are by Michener (1951), Snelling (1974, 1984), and Ayala (1998).

The objective of this paper is to publish two new subgenera of Centridini that I recognized during a study of the systematics and phylogeny of this tribe, so that the names can be used before the publication of that work (Ayala, 1998).

Acknowledgments

I am thankful to the following institutions and curators, who graciously provided material used in this study: Snow Entomological Collection, Division of Entomology, Natural History Museum and Biodiversity Research Center, University of Kansas, Lawrence, Kansas, M. S. Engel and R. W. Brooks (SEMC); Cornell University Insect Collection, Ithaca, New York, J. K. Liebherr and E. R. Hoebeke (CUIC); and American Museum of Natural History, New York, New York, J. G. Rozen, Jr. and E. Quinter (AMNH). Charles D. Michener and Michael S. Engel kindly examined an early version of the manuscript and provided valuable criticisms.

Padre J. S. Moure of the Universidade Federal do Paraná in Curitiba, Brazil, independently recognized the subgenera described below over 40 years ago and at some point provided unpublished names for them on labels and more recently in conversations. I am indebted to him for permission (1998) to use and publish his names, and I do so with pleasure to further, with Padre Moure, the development of a useful classification of the Centridini.

METHODS

Morphological terminology follows that of Michener (1944, 2000), Michener and Brooks (1984), and Winston (1979). In the descriptions the following abbreviations are used: F, flagellomere; S, metasomal sternum; T, metasomal tergum. Illustrations were prepared with the aid of a camera lucida mounted on an Olympus SZH microscope. Photographic images were produced by Michael S. Engel using a Microptics ML-1000 Digital Imaging System. Specimens for study were borrowed from the museums cited in the Acknowledgments.

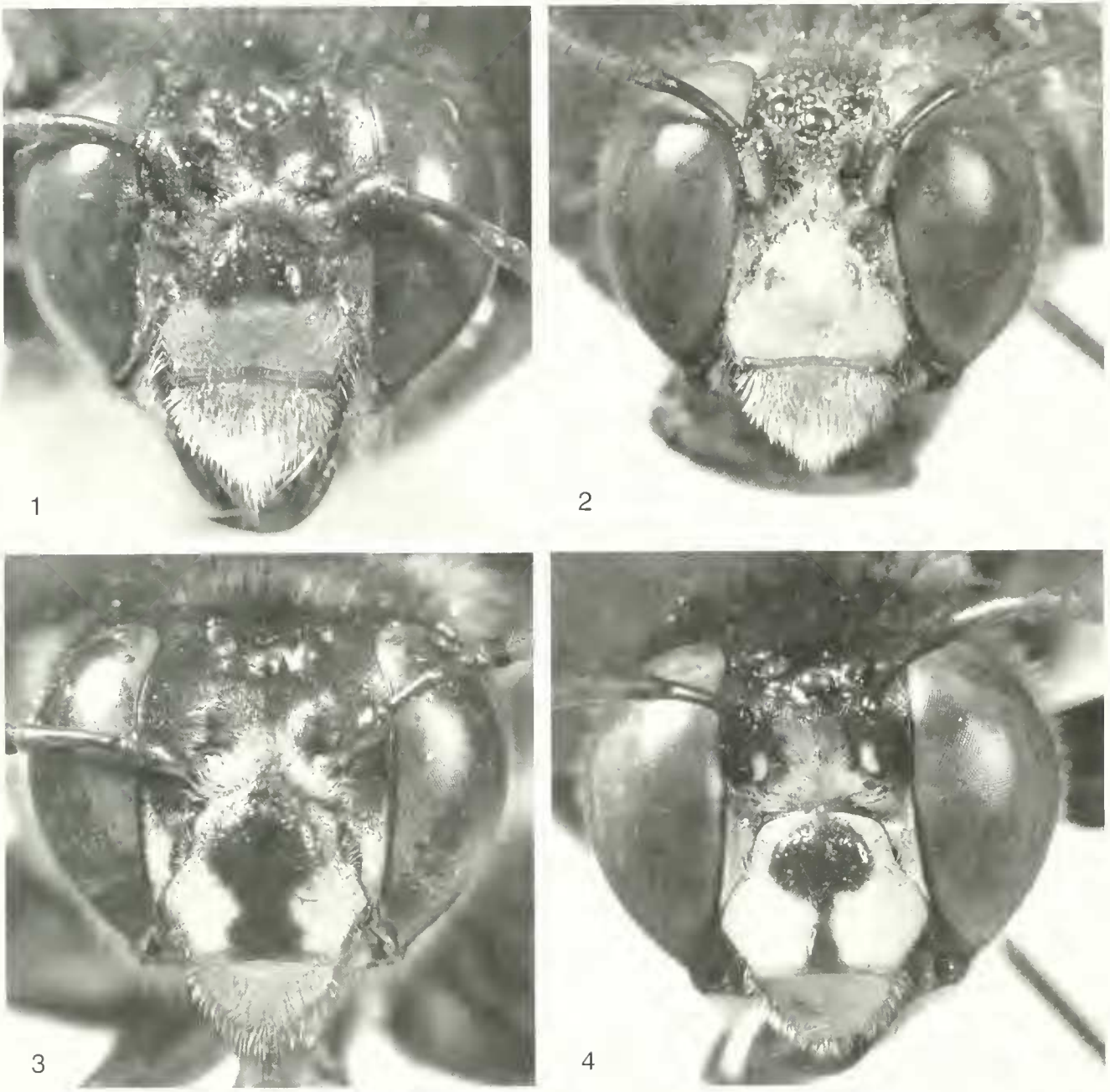
SYSTEMATICS

Aphemisia, new subgenus
(Figs. 3–14)

Type species.—*Centris plumipes* F. Smith, 1854.

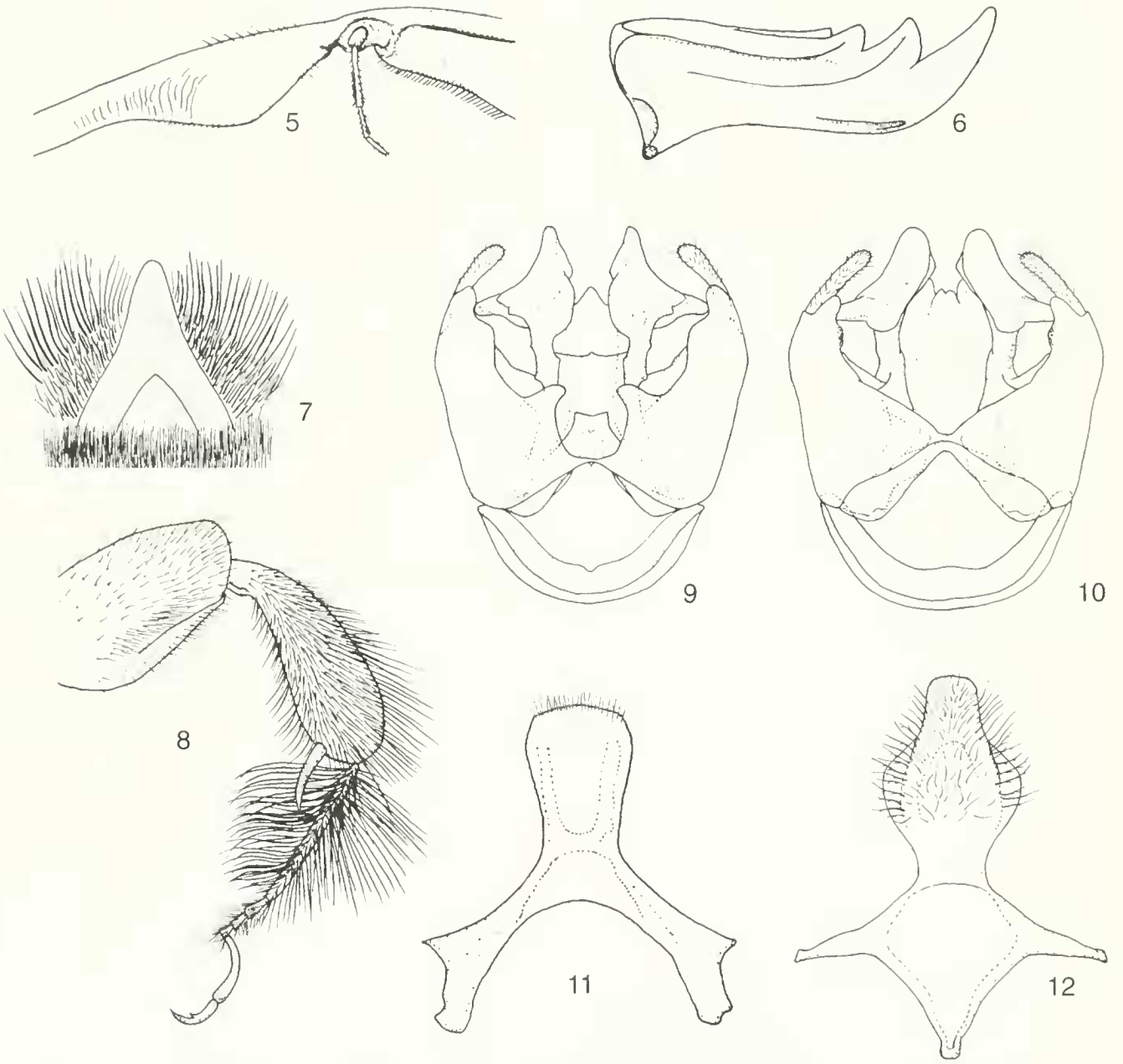
Diagnosis.—Female (Figs. 3, 7, 13, 14): Maxillary palpus with three free segments. Mandible curved in distal half, with fourth sharp teeth, two from the rastellum and two from the pollex; trimma with median denticular projection. Labrum yellow, wider than long, gently convex. Clypeus with longitudinal median black mark, its margins converging apically. Clypeocular distance about as wide as minimum width of F1. Lower paraocular area with yellow mark. Ocellocular space 1.5x diameter of lateral ocellus. Scutellum with two strong lobes (two strong elevations) lightly projected backwards (Fig. 13). Basitibial plate with sharp apex (Fig. 14); secondary plate elevated, apex slightly projecting beyond attachment to principal plate. Pygidial plate with pointed apex (Fig. 7); lateral margin concave; secondary plate triangular with margins elevated and projected above principal plate; surface of principal plate concave.

Male (Figs. 4–6, 8–12): Similar to female except as follows: Mandible strongly curved in the apical third (Fig. 6), with three sharp teeth, two from rastellum and one from pollex. Scutellum with two rounded lobes. Hind tibia and basitarsus with scopa-shaped pubescence (Fig. 8), large on the anterior and posterior margins. Hind femur swollen. Hind basitarsus with single spine on distal, inner margin. Terga with dark iridescent integument (variable among specimens). Pygidial plate absent but tergal margin with two lobes delimiting a notch.



Figs. 1–4. Faces of *Centris* species. 1. Facial view of female of *Centris* (*Schisthemisia*) *flavilabris* Mocsáry. 2. Facial view of male of *C.* (*S.*) *flavilabris*. 3. Facial view of female of *C.* (*Aphemisia*) *plumipes* Smith. 4. Facial view of male of *C.* (*A.*) *plumipes*.

Description.—As in the diagnosis with the following additions: FEMALE: Maxillary palpus with sparse pubescence, if present no longer than width of segment, first free segment longer than second. Mandible without subapical, internal tooth; acetabular carina reaching base of fourth tooth; trimmal extension with tooth-like projection at two-thirds or three-fourths of distance between internal tooth and mandibular base; rastellum with two teeth; pollex with tooth (usually very sharp). Labrum wider than long, with sparse pubescence. Clypeus little projected, in lateral view gently rounded above, with discal area gently convex to weakly concave; lower margin and submargin with weak sulcus, defined by hyaline area; clypeus with longitudinal yellow line. F1 at least a little longer than scape. Paraocular area with alveolus-orbital space longer than diameter of alveolus. Lateral ocellus



Figs. 5–12. *Centris* (*Aphemisia*) *plumipes* Smith, male. 5. Lateral view of galeal base, maxillary palpus, and apex of stipes. 6. Mandible. 7. Pygidial plate. 8. Hind leg. 9. Genital capsule, dorsal aspect. 10. Genital capsule, ventral aspect. 11. Metasomal sternum 7. 12. Metasomal sternum 8.

below upper tangent of compound eyes. Vertex, in frontal view, at same level as upper ends of eyes. Occipital area with plumose pubescence. Scutellum with abundant pubescence but not dense, with two tubercles (Fig. 13). Length of marginal cell less than distance from apex of cell to wing tip; wing membrane dark brown, translucent. Fore basitarsus with elaiospathe on anterior margin and long setae making other comb on anterior margin. Mid tibia with elaiospathe. Spur of the mid tibia flat and short, usually as long as F1 and F2 together. Inner spur of hind tibia longer than outer spur. Scopa of hind tibia consisting of plumose hairs with branches arising from a robust central rachis. Basitibial plate with secondary plate elevated (Fig. 14), with the margin well defined and apex inside principal plate. Hind basitarsus with posterior margin of distal internal area with simple robust hairs. Metasomal terga with metallic iridescence, integument of T2 punctate but not strongly, slightly shiny; pubescence of the T2 and T3 very short, not dense; T2–4 without fringes at distal margins; T4–5 without dense pubescence, T5 with

apical fringe of appressed strong dense hairs. Pygidial plate narrowing to attenuate acute apex (Fig. 7). Secondary pygidal plate formed with a basal triangle. S4 and S5 with plumose hairs only on distal margins.

Male: Labrum much wider than long. Clypeus with black macula narrowing from superior margin to inferior. Malar area much longer than clypeus-ocular distance. Scape shorter than F1, F1 longer than combined lengths of F2 and F3. Compound eyes converging dorsally, or slightly so. Vertex in frontal view below level of superior margins of eyes. Scutellum with two tubercles. Femora swollen (Fig. 8). Pygidial plate with posterior margin bilobulate; S7 with medial projection (Fig.11); S8 with medial projection on distal margin elongate with medial part broad (Fig. 12). Genitalia as in figures 9 and 10.

Comments.—The species of this subgenus were previously included in the subgenus *Melacentris* (= *Melanocentris* sensu Snelling, 1984). *Aphemisia* was named by Pe. J. S. Moure on the labels of specimens in the insect collections of Cornell University (CUIC) and of the Natural History Museum, University of Kansas (SEMC). It seems appropriate to use the name proposed by Pe. Moure for this taxon, as recommended by Pe. Moure himself (pers. comm., 1998). *Aphemisia* presents many apomorphic characters. The phylogenetic analysis (Ayala, 1998) shows that this new subgenus is sister to *Schisthemisia* and is part of the larger group including *Melacentris*.

Distribution.—The known specimens are from Amazonas in Venezuela (Territorio del Amazonas), Ecuador (Guapore; Limoncocha), Brazil (Distrito Federal; Pará), Perú (Azupizu), Bolivia ("Chiapare" [=Chaparé]), French Guiana (Montagne de Pére, Kourou), and Panamá (Canal Zone).

Included species.—Two species are presently included, *Centris* (*Aphemisia*) *plumipes* Smith, 1854 and *Centris* (*Aphemisia*) n. sp. (SEMC).

Schisthemisia, new subgenus

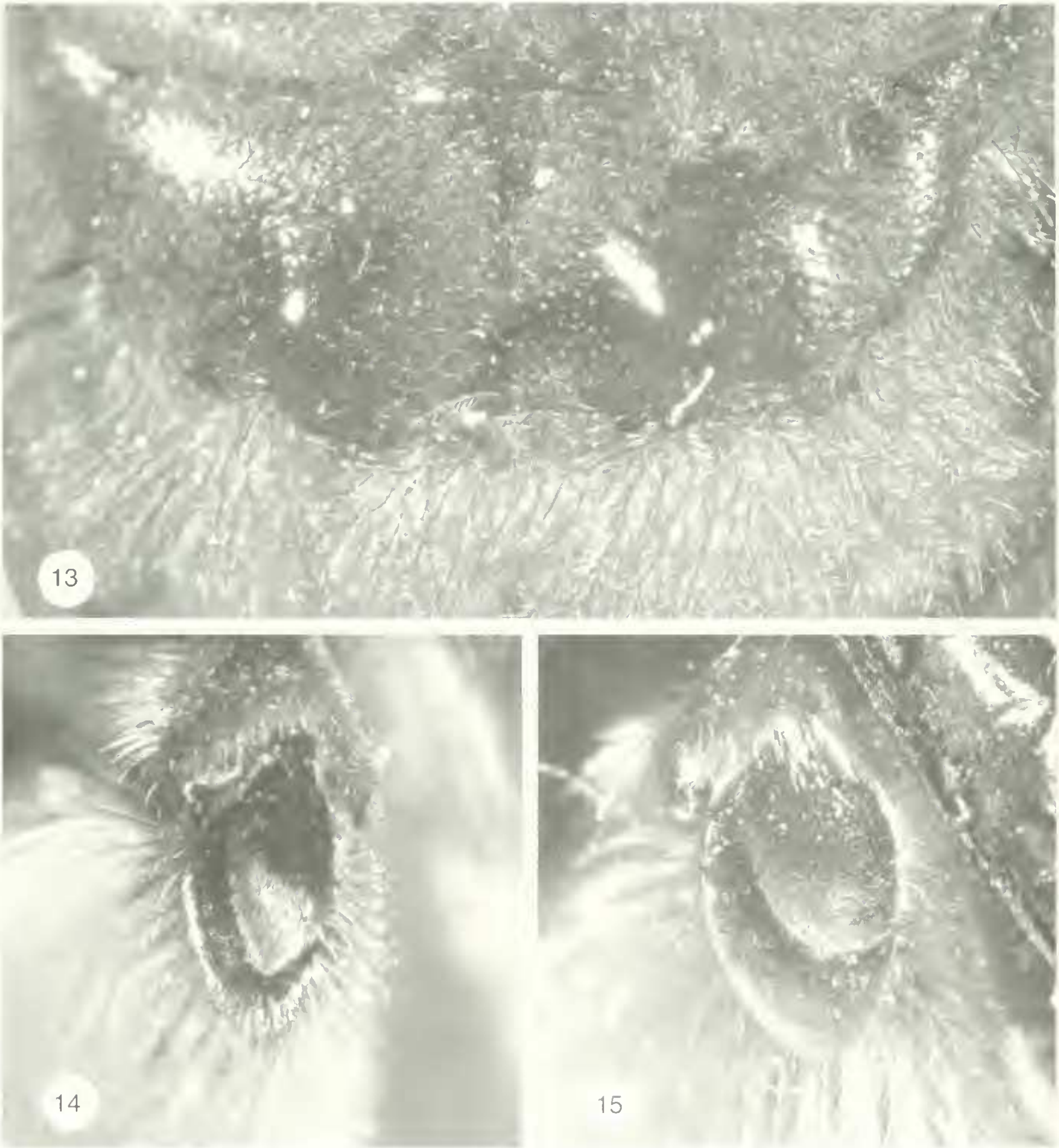
(Fig. 1–2, 15–23)

Type species.—*Centris flavilabris* Mocsáry, 1899.

Diagnosis.—Female: (Figs. 1–2, 15, 18): Mandible with strong angle at level of distal third, distal margin broad, with five teeth, three on rastellum and two on pollex; trimma with tooth-like projection on distal area. Clypeus yellow in lower two-thirds or with two light spots. Paraocular area with lower part yellow. Clypeocular area as wide as minimum width of F1. Vertex above level of upper margin of eyes. Scutellum rounded with two tubercles; posterior margin vertical, continuous with metanotum and propodeum. Basitibial plate with secondary plate elevated, with the margins well projected along anterior and distal margins, along posterior margin only slightly projected over surface of principal plate, distal margin rounded (Fig. 15). Margins of pygidial plate converging posteriorly, but apex broad, notched (Fig. 18); secondary pygidial plate rounded, with a small point (Fig. 18).

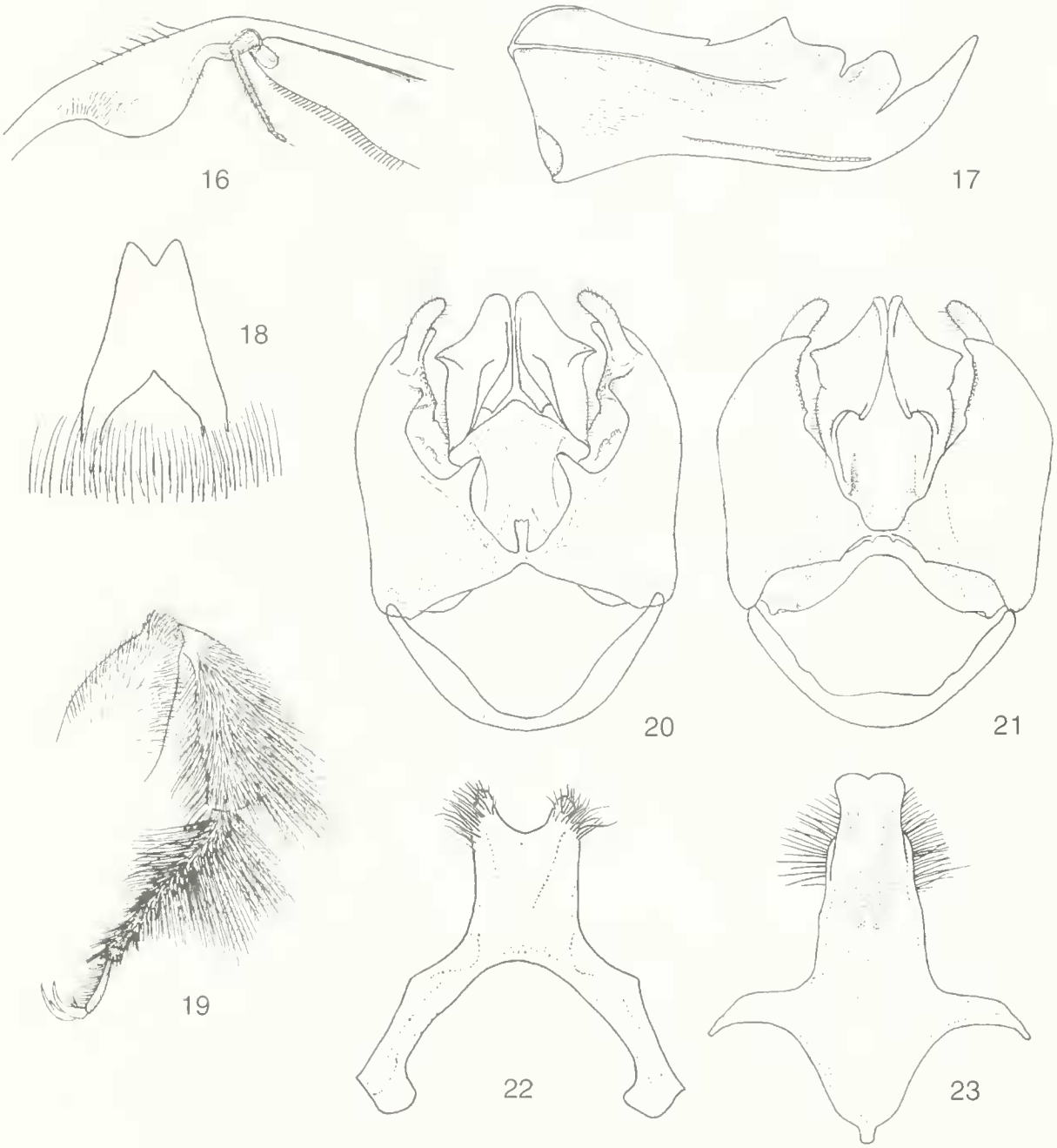
Male: Maxillary palpus with three free segments (Fig. 16). Mandible with four teeth, apical tooth acute, other teeth as in figure 17; acetabular carina ending at base of more internal tooth and with branches of carina extending toward other tooth of pollex. Labrum wider than long, yellow. Clypeus yellow, with black spots toward the upper margin (some species with upper margin of clypeus black). Clypeocular distance shorter than minimum width of F1. Lower paraocular area yellow. Compound eyes converging dorsally (Fig. 2). Ocellocular space narrow, about one-half of ocellar diameter (based upon median ocellus). Upper margin of the head (frontal view) at level of upper ocular tangent. Scutellum with two lobes rounded and projected backwards. Hind leg with femur swollen and tibia slightly swollen, tibia and basitarsus with pubescence scopa-like (Fig. 19). Metasomal terga with integument shiny but not polished, brown or dark brown; pygidial tergum with well defined plate with posterior margin bilobulate forming strong notch, the plate trapezoidal with margin elevated and with little pubescence.

Description.—Female: Maxillary palpus with three free segments; first free segment longer than second. Galea with basal inferior margin with a well-defined lobe. Mandible with inner subapical area lacking tooth. Acetabular carina reaching base of fourth tooth; trimma with a tooth on two-thirds or three-fourths of distance from inner tooth to mandibular base; rastellum with three teeth; pollex with two teeth. Labrum wider than long, with little pubescence. Clypeus projecting or little projecting with rather flat discal area, discal surface with rounded margins, with or without central depression; lower margin and submargin of clypeus with weak sulcus, defined by hyaline area. Clypeus with black macula on upper margin (Fig. 1). F1 at least slightly longer than scape. Alveolus-orbital space as long as diameter of alveolus. Lateral ocelli in facial view below upper tangent of eyes. Vertex in facial view above upper tangent of eyes (Fig. 1). Mesoscutum with pubescence plumose, abundant or dense, completely covering integument. Scutellum with two tubercles (or lobes) little or slightly elevated. Axillar surface elevated above level of scutellum. Forewing papillae each ending with a seta; marginal cell shorter than distance from its apex to wing tip; wing membrane translucent, ochre or dark ochre, without or with weak iridescence. Fore basitarsus with elaiospathe on anterior margin and long hair forming comb on posterior margin. Midtibia with elaiospathe; spur flat and short, as long as F1 or combined



Figs. 13–15. Mesosomal characters of *Centris* species. 13. Scutellum of female *Centris (Aphemisia) plumipes* Smith. 14. Basitibial plate of *C. (A.) plumipes*. 15. Basitibial plate of *C. (Schisthemisia) flavilabris* Mocsary.

length of F1 and F2. Inner hind tibial spur pectinate; inner and outer spurs similar in length. Scopa on hind tibia with plumose hairs emerging from strong, central rachis; basitibial plate with secondary plate elevated, its margin defined, without yellow markings; secondary plate with apex rounded, inside margin of principal plate. Hind basitarsus with simple, robust hairs, with bent apices, on the distal internal area of posterior margin. Terga without metallic iridescence; T2 with weak punctation not strong, weakly shiny; T2 and T3 with short but not dense



Figs. 16–23. *Centris* (*Schisthemisia*) *flavilabris* Mocsary, male. 16. Lateral view of galeal base, maxillary palpus, and apex of stipes. 17. Mandible. 18. Pygidial plate. 19. Hind leg. 20. Genital capsule, dorsal aspect. 21. Genital capsule, ventral aspect. 22. Metasomal sternum 7. 23. Metasomal sternum 8.

pubescence; T2–4 without apical fringes of hair; T5 with fringe on margin of strong appressed hairs; pygidial plate with margins converging (Fig. 18), apex truncate with strong median notch; secondary pygidial plate rounded (Fig. 18); S4–5 with plumose hairs only on distal margins, not obscuring surface; S6 with apex rounded, short, or ending in a tuft of hairs.

MALE: Similar to female. Labrum broader than long. Malar space short, as long as clypeocular space. Scape shorter than F1; F1 longer than combined length of F2 and F3. Compound eyes converging dorsally (Fig. 14). Vertex at level of upper ocular tangent (Fig. 2). Hind femur swollen; hind basitarsus with posterior margin lacking carina and denticulate projection. Pygidial plate with apex

bilobulate. S7 slender with elongate medial projection with strong notch at apex (Fig. 22); S8 with medial projection of distal margin elongate, widened in mid distal part (Fig. 23); genitalia as in figures 20 and 21.

Comments.—The name of this subgenus was suggested by Pe. J. S. Moure more than 40 years ago when he independently recognized this subgenus as new but never published on it. I found it on labels of specimens in CUIC and SEMC, and publish it here with his permission, given in 1998. See notes under *Aphemisia*.

The species of this subgenus were previously included in *Melacentris* (= *Melanocentris* sensu Snelling, 1984). This is the sister subgenus of *Aphemisia*. The subgenus *Schisthemisia* can be recognized by the shape of the mandibles, scutellum, hind tibia, and pygidium. The male can be separated from other *Centris* by the shape of the clypeus and scutellum.

Distribution.—The only known specimens of this subgenus were collected in Brazil (Amazonas, Guapore) and Bolivia (La Paz, Beni).

Included species.—*Centris* (*S.*) *flavilabris* Mocsáry, 1899 and *C.* (*S.*) *fusciventris* Mocsáry, 1899.

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